

1/11

FIGURE 1.

Ammonifex degensii KC4 Phosphatase (3A1A=3A2A)
Complete gene sequence

1 ATGAGGGGGAGCGGAGTGGGATACTTCTCACCAACGATGACGGCATCTTTGCCGAGGGT
MetArgGlySerGlyValArgIleLeuLeuThrAsnAspAspGlyIlePheAlaGluGly
21 CTGGGGGCTCTGCGCAAGATGCTGGAGCCCGTGGCTACCCCTTACGTGGTGGCTCCGGAC
LeuGlyAlaLeuArgLysMetLeuGluProValAlaThrLeuTyrValValAlaProAsp
41 CGAGAGCGTAGCGCGGCCAGCCATGCTATCACCGTTCACCGCCCCCTGCGGGTGGGGAG
ArgGluArgSerAlaAlaSerHisAlaIleThrValHisArgProLeuArgValArgGlu
61 GCGGGTTTTTCGAGCCCCAGGCTTAAAGGCTGGGTAGTGGACGGTACCCCGGCCGACTGC
AlaGlyPheArgSerProArgLeuLysGlyTrpValValAspGlyThrProAlaAspCys
81 GTCAAGCTGGGCCTGGAGGTACTTTTGGCCGAACGTCCAGATTTCTGGTTTTCGGGCATA
ValLysLeuGlyLeuGluValLeuLeuProGluArgProAspPheLeuValSerGlyIle
101 AACTACGGGCCCCAACCTGGGTACCGACGTACTTTACTCCGGCACCGTCTCGGCGGCCATA
AsnTyrGlyProAsnLeuGlyThrAspValLeuTyrSerGlyThrValSerAlaAlaIle
121 GAAGGGGTAAATTAACGGCATTCCTCGGTGGCCGTATCTTTGGCCACGCGCGGGAGCCG
GluGlyValIleAsnGlyIleProSerValAlaValSerLeuAlaThrArgArgGluPro
141 GACTATACCTGGGCGGCCCGGTTCTGCTCCTGGTCTGCTGGAGGAACGCGAAAACACCAA
AspTyrThrTrpAlaAlaArgPheValLeuValLeuLeuGluGluLeuArgLysHisGln
161 CTGCCCCCAGGAACCTGCTCAACGTCAACGTGCCCCGACGGGGTGCCCCGCGGGTCAAG
LeuProProGlyThrLeuLeuAsnValAsnValProAspGlyValProArgGlyValLys
181 GTGACCAAACCTGGGAAGCGTACGCTACGTCAACGTGGTAGACTGCCGCACCGACCCCTCGG
ValThrLysLeuGlySerValArgTyrValAsnValValAspCysArgThrAspProArg
201 GGGAAAGGCTTACTACTGGATGGCGGGAGAACCATTTGGAGCTGGACGGCAACGACTCCGAA
GlyLysAlaTyrTyrTrpMetAlaGlyGluProLeuGluLeuAspGlyAsnAspSerGlu
221 ACCGACGTCTGGGCGGTGCGAGAAGGCTATATTTCCGTAACACCGGTCCAGATCGACCTT
ThrAspValTrpAlaValArgGluGlyTyrIleSerValThrProValGlnIleAspLeu
241 ACTAACTACGGCTTCCTGGAAGAACTCAAAAAATGGCGTTTCAAGGATATCTTTTCTTCT
ThrAsnTyrGlyPheLeuGluGluLeuLysLysTrpArgPheLysAspIlePheSerSer
261 TAA
End 261

2/11

FIGURE 2

Methanococcus igneus K015 Phosphatase (9A1A)
Complete Gene Sequence

ATGTTGGATATACTGCTTGTAAATGATGATGGCATTATTTCAAATGGATTAATAGCTTTG
1 MetLeuAspIleLeuLeuValAsnAspAspGlyIleTyrSerAsnGlyLeuIleAlaLeu

AAGGATGCATTATTGGAAAAATTTAATGCGAGGATTACTATTGTAGCCCCAACAAATCAG
21 LysAspAlaLeuLeuGluLysPheAsnAlaArgIleThrIleValAlaProThrAsnGln

CAGAGTGGTATTGGTAGGGCAATAAGTTTATTCGAGCCGTTAAGGATAACTAAACCAAA
41 GlnSerGlyIleGlyArgAlaIleSerLeuPheGluProLeuArgIleThrLysThrLys

TTAGCAGATGGTTCTTGGGGATATGCAGTTTCAGGAACCCCAACAGATTGCGTTATATTG
61 LeuAlaAspGlySerTrpGlyTyrAlaValSerGlyThrProThrAspCysValIleLeu

GGCATTATGAGATATTAAAGAAGGTACCTGATGTAGTTATATCAGGAATAAACATTGGA
81 GlyIleTyrGluIleLeuLysLysValProAspValValIleSerGlyIleAsnIleGly

GAAACCTTGGGACTGAAATAACAACCTTCTGGAACGTTGGGGGCTGCGTTTGAAGGGGCC
101 GluAsnLeuGlyThrGluIleThrThrSerGlyThrLeuGlyAlaAlaPheGluGlyAla

CATCATGGGGCTAAGGCATTAGCATCATCACTCCAAGTTACCTCTGACCATCTAAAGTTT
121 HisHisGlyAlaLysAlaLeuAlaSerSerLeuGlnValThrSerAspHisLeuLysPhe

AAAGAGGGGGAGACCCCAATAGACTTCACAGTCCCAGCAAGAATTACTGCAAAATGTTGTT
141 LysGluGlyGluThrProIleAspPheThrValProAlaArgIleThrAlaAsnValVal

GAGAAGATGTTGGATTATGATTTCCCATGTGATGTCGTCAACTTAAACATTCCAGAAGGA
161 GluLysMetLeuAspTyrAspPheProCysAspValValAsnLeuAsnIleProGluGly

GCAACAGAAAAGACACCGATTGAAATCACAAGGTTGGCAAGGAAAATGTATACAACACAC
181 AlaThrGluLysThrProIleGluIleThrArgLeuAlaArgLysMetTyrThrThrHis

GTTGAGGAAAGAATAGATCCAAGAGGGAGGAGTTATTATTGGATTGATGGGTATCCTATT
201 ValGluGluArgIleAspProArgGlyArgSerTyrTyrTrpIleAspGlyTyrProIle

TTAGAGGAAGAGGAAGACACTGATGTCTATGTTGTTAGAAGAAAGGGACATATTTCTCTA
221 LeuGluGluGluGluAspThrAspValTyrValValArgArgLysGlyHisIleSerLeu

ACCCCATTAACATTAGACACAACAATTAATAATTTAGAGGAATTTAAGAAAAAATATGAG
241 ThrProLeuThrLeuAspThrThrIleLysAsnLeuGluGluPheLysLysLysTyrGlu

AGAATATTAAATGAATGA
261 ArgIleLeuAsnGluEnd 266

3/11

FIGURE 3

Thermococcus alcaliphilus AEDIII2RA Phosphatase (18A)
Complete Gene Sequence

1 ATGATGATGGAATTCACCTCGCGAGGGAATAAAAGCTGCTGTAGAGGCACTTCAAGGGTTA
MetMetMetGluPheThrArgGluGlyIleLysAlaAlaValGluAlaLeuGlnGlyLeu

21 GGAGAGATCTACGTAGTTGCCCAATGTTTCAAAGGAGCGCAAGTGAAGGGCAATGACC
GlyGluIleTyrValValAlaProMetPheGlnArgSerAlaSerGlyArgAlaMetThr

41 ATCCACAGACCTCTAAGGGCTAAAAGAATAAGTATGAACGGTGCAAAAGCAGCCTATGCT
IleHisArgProLeuArgAlaLysArgIleSerMetAsnGlyAlaLysAlaAlaTyrAla

61 TTGGATGGAATGCCCGTTGATTGCGTTATCTTTGCCATGGCCAGATTGAGATTTCGAC
LeuAspGlyMetProValAspCysValIlePheAlaMetAlaArgPheGlyAspPheAsp

81 CTTGCAATAAGTGGTGTAACCTTGGGAGAAAAACATGAGCACCGAGATAACGGTTTCCGGG
LeuAlaIleSerGlyValAsnLeuGlyGluAsnMetSerThrGluIleThrValSerGly

101 ACTGCAAGCGCTGCAATAGAGGCTGCAACCCAAGAGATCCCAAGCATTCCCATAAGCCTG
ThrAlaSerAlaAlaIleGluAlaAlaThrGlnGluIleProSerIleProIleSerLeu

121 GAAGTTAATAGAGAAAAACACAAATTTGGTGAGGGCGAAGAGATTGACTTCTCAGCTGCC
GluValAsnArgGluLysHisLysPheGlyGluGlyGluGluIleAspPheSerAlaAla

141- AAGTATTTCTAAGAAAAATCGCAACGGCGGTTTTAAAGAGAGGCCTCCCAAAGGAGTC
LysTyrPheLeuArgLysIleAlaThrAlaValLeuLysArgGlyLeuProLysGlyVal

161 GATATGCTGAACGTCAACGTCCCTTATGATGCAAATGAAAGGACAGAGATAGCTTTTACT
AspMetLeuAsnValAsnValProTyrAspAlaAsnGluArgThrGluIleAlaPheThr

181 CGCCTGGCAAGAAGGATGTATAGGCCTTCTATTGAAGAGCGCATAGACCCAAAGGGGAAT
ArgLeuAlaArgArgMetTyrArgProSerIleGluGluArgIleAspProLysGlyAsn

201 CCCTACTACTGGATAGTTGGAACCTCAGTGCCCTAAGGAGGCATTAGAGCCGGGAACGGAT
ProTyrTyrTrpIleValGlyThrGlnCysProLysGluAlaLeuGluProGlyThrAsp

221 ATGTATGTAGTTAAAGTTGAGAGAAAAGTTAGCGTGACTCCAATAAACATTGATATGACA
MetTyrValValLysValGluArgLysValSerValThrProIleAsnIleAspMetThr

241 GCAAGAGTGAATTTAGACGAGATTAAGAACTTTTAGAACTGTAG
AlaArgValAsnLeuAspGluIleLysArgLeuLeuGluLeuEnd 255

4/11

FIGURE 4

Thermococcus celer Phosphatase (25A1A)
Complete Gene Sequence

1 ATGAGAACCCTGACAATAAACA CTGACGCGGAGGGGTTGTTTTGAGGATTCTCCTGACG 20
MetArgThrLeuThrIleAsnThrAspAlaGluGlyPheValLeuArgIleLeuLeuThr
21 AACGACGATGGAATCTACTCCAACGGACTGCGCGCCGCTGTGAAAGCCCTGAGTGAGCTC 40
AsnAspAspGlyIleTyrSerAsnGlyLeuArgAlaAlaValLysAlaLeuSerGluLeu
41 GGCGAAGTTTACGTCGTTGCCCCCTCTTCCAGAGGAGCGCGAGCGGCAGGGCCATGACG 60
GlyGluValTyrValValAlaProLeuPheGlnArgSerAlaSerGlyArgAlaMetThr
61 CTCCACAGGCCGATAAGGGCCAAGCGCGTTGACGTTCCCGGCGCAAAGATAGCCTACGGA 80
LeuHisArgProIleArgAlaLysArgValAspValProGlyAlaLysIleAlaTyrGly
81 ATAGATGGAACCTCCTACTGACTGCGTGATTTTCGCCATAGCCCGCTTCGGGAGCTTTGGT 100
IleAspGlyThrProThrAspCysValIlePheAlaIleAlaArgPheGlySerPheGly
101 TTAGCCCGTGAGCGGGATTAACTTCGGCGAGAACCTGAGCACCGAGATAACAGTCTCAGGG 120
LeuAlaValSerGlyIleAsnLeuGlyGluAsnLeuSerThrGluIleThrValSerGly
121 ACGGCCTCCGCTGCCATAGAGGCCTCAACTCATGGAATTCGAGCATAGCGATTAGCCTT 140
ThrAlaSerAlaAlaIleGluAlaSerThrHisGlyIleProSerIleAlaIleSerLeu
141 GAGGTGGAGTGAAGAAGACCCTCGGCGAGGGTGAGGGGGTTGACTTCTCGGTCTCGACT 160
GluValGluTrpLysLysThrLeuGlyGluGlyGluGlyValAspPheSerValSerThr
161 CACTTCCTCAAGAGAATCGCGGGAGCCCTCTTGGAGAGAGGTCTTCCTGAGGGCGTTGAC 180
HisPheLeuLysArgIleAlaGlyAlaLeuLeuGluArgGlyLeuProGluGlyValAsp
181 ATGCTCAACGTCAACGTTCCGAGCGACGCGACGGAGGAAACGGAGATAGCAATCACCCGC 200
MetLeuAsnValAsnValProSerAspAlaThrGluGluThrGluIleAlaIleThrArg
201 TTAGCCCGGAAGCGCTACTCCCCAACGGTCGAGGAGAGGATTGACCCCAAGGGCAACCCC 220
LeuAlaArgLysArgTyrSerProThrValGluGluArgIleAspProLysGlyAsnPro
221 TACTACTGGATTGTCCGGCAAACCTTGTTCCAAGACTTCGAGCCAGGGACAGATGCCTACGCC 240
TyrTyrTrpIleValGlyLysLeuValGlnAspPheGluProGlyThrAspAlaTyrAla
241 CTGAAGGTCGAGAGGAAGGTCAGCGTCACGCCGATAAACATAGATATGACTGCGAGGGTG 260
LeuLysValGluArgLysValSerValThrProIleAsnIleAspMetThrAlaArgVal
261 GACTTTGAGGAGCTTGTAAGGGTTCTGTGGGTGTAA 272
AspPheGluGluLeuValArgValLeuTrpValEnd

5/11

FIGURE 5A

Thermococcus GU5L5 Phosphatase (26A1A)
Complete Gene Sequence (Part 1 of 2)

1 ATGAAAGGAAAGTCTCTTGTAGCGGTCTGTTGTTGGGTCTTTTAATTTGAGCCTGATT 20
MetLysGlyLysSerLeuValSerGlyLeuLeuLeuGlyLeuLeuIleLeuSerLeuIle
21 TCATTCCAGCCAAGCTTTGCATACTCCCCACACGGCGGTGTCAAAAACATCATAATCCTG 40
SerPheGlnProSerPheAlaTyrSerProHisGlyGlyValLysAsnIleIleIleLeu
41 GTTGAGACGGCATGGGTCTTGGGCATGTAGAAATTACAAAGCTCGTTTATGGACACTTA 60
ValGlyAspGlyMetGlyLeuGlyHisValGluIleThrLysLeuValTyrGlyHisLeu
61 AACATGGAAAACCTTCCAGTTACTGGATTGAGCTTACTGATTCCCTAAGTGGTGAAGTT 80
AsnMetGluAsnPheProValThrGlyPheGluLeuThrAspSerLeuSerGlyGluVal
81 ACAGATTCTGCTGCGGCAGGAAGTCAATATCCACTGGAGCTAAAACGTATAATGGTATG 100
ThrAspSerAlaAlaAlaGlyThrAlaIleSerThrGlyAlaLysThrTyrAsnGlyMet
101 ATTTTCAGTAACCAACATAACCGGAAAGATAGTTAACTTAACAACCCTACTTGAAGTGGCT 120
IleSerValThrAsnIleThrGlyLysIleValAsnLeuThrThrLeuLeuGluValAla
121 CAAGAGCTTGGGAAGTCAACAGGGCTGGTCACCACAACAAGGATTACCCATGCAACTCCA 140
GlnGluLeuGlyLysSerThrGlyLeuValThrThrThrArgIleThrHisAlaThrPro
141 GCAGTTTTTGCCTCCCATGTCCCAGATAGGGATATGGAGGGGGAGATACCCAAGCAACTC 160
AlaValPheAlaSerHisValProAspArgAspMetGluGlyGluIleProLysGlnLeu
161 ATAATGCACAAAGTTAACGTCTTGTGTTGGGTGGTGAAGGGAGAAATTCGATGAGAAAAAT 180
IleMetHisLysValAsnValLeuLeuGlyGlyGlyArgGluLysPheAspGluLysAsn
181 TTGGAGCTGGCCAAAAAGCAGGGATACAAAGTAGTTTTTCACGAAGGAAGAGCTTGAAAAA 200
LeuGluLeuAlaLysLysGlnGlyTyrLysValValPheThrLysGluGluLeuGluLys
201 GTTGAAGGAGATTATGTCCTAGGACTCTTTCAGAAAAGTCACATCCCTTACGTATTGGAT 220
ValGluGlyAspTyrValLeuGlyLeuPheAlaGluSerHisIleProTyrValLeuAsp
221 AGAAAACCCGATGATGTTGGACTTTTAGAAATGGCCAAAAAGGCAATTTCAATACTCGAG 240
ArgLysProAspAspValGlyLeuLeuGluMetAlaLysLysAlaIleSerIleLeuGlu
241 AAGAACCCGAGCGGATTCTTCTCATGGTTGAGGGCGGAAGGATTGACCATGCAGCCCAT 260
LysAsnProSerGlyPhePheLeuMetValGluGlyGlyArgIleAspHisAlaAlaHis
261 GGAAACGATGTCGCATCGGTTGTTGCAGAACTAAGGAGTTTGACGATGTTGTCAGATAC 280
GlyAsnAspValAlaSerValValAlaGluThrLysGluPheAspAspValValArgTyr
281 GTGCTGGAATATCCGAAGAAGAGGGGAGATACCTTGGTAATAGTGCTTGCCGATCACGAA 300
ValLeuGluTyrProLysLysArgGlyAspThrLeuValIleValLeuAlaAspHisGlu
301 ACTGGAGGTCTTGCAATAGGTCTAACGTATGGAAATGCAATCGATGAAGATGCCATAAGA 320
ThrGlyGlyLeuAlaIleGlyLeuThrTyrGlyAsnAlaIleAspGluAspAlaIleArg
321 AAAATAAAAGCAAGCAGCTTGAGGATGCCCCAAAGAGGTTAAGGCAGGGAGTAGTGTAATA 340
LysIleLysAlaSerThrLeuArgMetProLysGluValLysAlaGlySerSerValLys

6/11

FIGURE 5B

Thermococcus GU5L5 Phosphatase (26A1A)
Complete Gene Sequence (Part 2 of 2)

341 GAGTCCTCAAAGGTATGCCGGATTTGTCCCAACAGAGGAAGAAGTCAGTATATTGAGAAT 360
GluSerSerLysValCysArgIleCysProAsnArgGlyArgSerGlnTyrIleGluAsn

361 GCGCTGCACTCGACAAACAAGTATGCCCTCTCAAATGCAGTAGCCGATGTTATAAACAGG 380
AlaLeuHisSerThrAsnLysTyrAlaLeuSerAsnAlaValAlaAspValIleAsnArg

381 CGTATTGGTGTGGATTACCTCCTATGAGCATACAGGAGTTCCAGTTCCGCTCTTAGCT 400
ArgIleGlyValGlyPheThrSerTyrGluHisThrGlyValProValProLeuLeuAla

401 TACGGTCCCGGGGAGAGAACTTCAGAGGTTTCTTACACCATGTGGATACAGCAAGATTA 420
TyrGlyProGlyAlaGluAsnPheArgGlyPheLeuHisHisValAspThrAlaArgLeu

421 GTTGCAAAGTTAATGCTCTTTGGAAGGAGGAATATTCCAGTTACCATTTCAGCGTGAGC 440
ValAlaLysLeuMetLeuPheGlyArgArgAsnIleProValThrIleSerSerValSer

441 AGTGTTAAGGGAGACATAACCGGTGATTACAGGGTTGATGAGAAGGATGCCTACGTTACG 460
SerValLysGlyAspIleThrGlyAspTyrArgValAspGluLysAspAlaTyrValThr

461 CTCATGATGTTTCTCGGAGAAAAAGTGATAATGAAATTGAAAAGAGAGTCGATATAGAC 480
LeuMetMetPheLeuGlyGluLysValAspAsnGluIleGluLysArgValAspIleAsp

481 AACACGGCATGGTTGACTTAAATGACGTCATGTTGATTCTCCAGGAAGCTTGA 498
AsnAsnGlyMetValAspLeuAsnAspValMetLeuIleLeuGlnGluAlaEnd

7/11

FIGURE 6A

OC9a Phosphatase (27A3A)
Complete Gene Sequence (Part 1 of 2)

ATGCCAAGAAATATCGCCGCTGTATGCGCCCTGGCCGCTTGTAGGGTCGGCCTGGGCG
1 MetProArgAsnIleAlaAlaValCysAlaLeuAlaAlaLeuLeuGlySerAlaTrpAla 20

GCCAAAGTTGCCGTCTACCCCTACGACGGAGCCGCTTGTGCTGGCGGGGAGCGCTTCGAT
21 AlaLysValAlaValTyrProTyrAspGlyAlaAlaLeuLeuAlaGlyGlnArgPheAsp 40

TTGCGCATAGAAGCCTCCGAGCTGAAAGGCAATTTAAAGGCTTACCGCATCACCCCTGGAC
41 LeuArgIleGluAlaSerGluLeuLysGlyAsnLeuLysAlaTyrArgIleThrLeuAsp 60

GGCCAGCCTCTGGCGGGCCTCGAGCAAACCGCGCAGGGGGCCGGGCAGGCCGAGTGGACC
61 GlyGlnProLeuAlaGlyLeuGluGlnThrAlaGlnGlyAlaGlyGlnAlaGluTrpThr 80

CTGCGCGGTGCCTTCCTGCGCCCTGGAAGCCACACCCCTCGAGGTCAGCCTCACCGACGAC
81 LeuArgGlyAlaPheLeuArgProGlySerHisThrLeuGluValSerLeuThrAspAsp 100

GCTGGGGAGAGCAGGAAGAGCGTACGTTGGGAGGCTCGGCAGAACCTTCGCTTGCCCCGA
101 AlaGlyGluSerArgLysSerValArgTrpGluAlaArgGlnAsnLeuArgLeuProArg 120

GCGGCCAAGAATGTGATCTCTTCATTGCGCAGGGATGGGCTGGAACACCCCTCAACGCC
121 AlaAlaLysAsnValIleLeuPheIleGlyAspGlyMetGlyTrpAsnThrLeuAsnAla 140

GCCCGCATCATCGCCAAAGGCTTTAACCCCGAAAACGGTATGCCCAACGGAAACCTCGAG
141 AlaArgIleIleAlaLysGlyPheAsnProGluAsnGlyMetProAsnGlyAsnLeuGlu 160

ATCGAGAGTGGTTACGGTGGGATGGCTACCGTCACTACCGGCAGCTTTGATAGCTTCATC
161 IleGluSerGlyTyrGlyGlyMetAlaThrValThrThrGlySerPheAspSerPheIle 180

GCCGACTCAGCTAACTCGGCTTCTTCCATCATGACCGGGCAGAAGGTGCAGGTGAATGCC
181 AlaAspSerAlaAsnSerAlaSerSerIleMetThrGlyGlnLysValGlnValAsnAla 200

CTCAACGTTTACCCATCAAACCTCAAAGATACCCTGGCCTACCCCGGATCGAAACCTTA
201 LeuAsnValTyrProSerAsnLeuLysAspThrLeuAlaTyrProArgIleGluThrLeu 220

GCGGAGATGCTCAAGCGGTACGCGGGGCCAGCATTGGGGTAGTGACCACCACCTTCGGC
221 AlaGluMetLeuLysArgValArgGlyAlaSerIleGlyValValThrThrThrPheGly 240

ACCGACGCTACCCCGGCTTCACTCAACGCCCATACCCGCGCCGCGGTGATTACCAGGCT
241 ThrAspAlaThrProAlaSerLeuAsnAlaHisThrArgArgArgGlyAspTyrGlnAla 260

ATCGCCGACATGTACTTTGGTAGAGCGGGTTCGGTGTTCCTTGGATGTGATGCTCTTC
261 IleAlaAspMetTyrPheGlyArgGlyGlyPheGlyValProLeuAspValMetLeuPhe 280

GGTGGTTCACGCGACTTCATCCCCAGAGCACCCCTGGCTCGCGCGCAAGGATAGCACG
281 GlyGlySerArgAspPheIleProGlnSerThrProGlySerArgArgLysAspSerThr 300

GACTGGATTGCCGAATCCCAGAAGCTGGGCTACACCTTTGTACGACCCGCGAGCGAGCTG
301 AspTrpIleAlaGluSerGlnLysLeuGlyTyrThrPheValSerThrArgSerGluLeu 320

CTGCGCGCCAAACCCACCGATAAGCTCTTTGGGCTGTTCAACATTGACAACTTCCCCAGC
321 LeuAlaAlaLysProThrAspLysLeuPheGlyLeuPheAsnIleAspAsnPheProSer 340

8/11

FIGURE 6B

OC9a Phosphatase (27A3A)
Complete Gene Sequence (Part 2 of 2)

341 TACCTAGACCGCGCAGTGTGGAAGCGGCCGAGATGCTGGGAAGCTTTACCGATATGCCC 360
TyrLeuAspArgAlaValTrpLysArgProGluMetLeuGlySerPheThrAspMetPro

361 TACCTCTGGGAGATGACCCAGAAAGCCGTGGAGGCTCTCTCCAGAAACGACAAAGGCTTT 380
TyrLeuTrpGluMetThrGlnLysAlaValGluAlaLeuSerArgAsnAspLysGlyPhe

381 TTCTTGATGGTTGAGGGGGAATGGTGGATAAGTACGAGCACCCCTTGGACTGGCCCCGC 400
PheLeuMetValGluGlyGlyMetValAspLysTyrGluHisProLeuAspTrpProArg

401 GCACTTTGGGATGTACTCGAGCTGGACCGCGCGGTGGCTTGGGCCAAGGGCTATGCGGCC 420
AlaLeuTrpAspValLeuGluLeuAspArgAlaValAlaTrpAlaLysGlyTyrAlaAla

421 TCCACCCCGATACCCTGGTGATTGTCACCGCCGACCACGCTCACTCGATCTCGGTGTTT 440
SerHisProAspThrLeuValIleValThrAlaAspHisAlaHisSerIleSerValPhe

441 GGCGGTTACGACTACTCCAAGCAGGGCCGGAGGGGGTGGGGGTTTATGAGGCCGCCAAG 460
GlyGlyTyrAspTyrSerLysGlnGlyArgGluGlyValGlyValTyrGluAlaAlaLys

461 TTCCCCACCTACGGCGACAAAAAGACGCCAACGGCTTTCCCTTGCCCCGACACCACTCGG 480
PheProThrTyrGlyAspLysLysAspAlaAsnGlyPheProLeuProAspThrThrArg

481 GGAATCGCGGTAGGCTTCGGGGCCACGCCGATTACTGTGAAACCTACCGGGGCCGCGAG 500
GlyIleAlaValGlyPheGlyAlaThrProAspTyrCysGluThrTyrArgGlyArgGlu

501 GTCTACAAAGACCCCAACATCTCCGACGGCAAAGGTGGTTACGTGGCCAACCCTGAGGTC 520
ValTyrLysAspProThrIleSerAspGlyLysGlyGlyTyrValAlaAsnProGluVal

521 TGCAAGGAGCCGGGCCTTCCAACGTATCGGCAACTCCAGTAGATAGCGCCCAGGGCGTG 540
CysLysGluProGlyLeuProThrTyrArgGlnLeuProValAspSerAlaGlnGlyVal

541 CACACGGCTGATCCCATGCCGCTGTTTGCCTTTGGCGTGGGGTCTCAGTTCTTCAATGGC 560
HisThrAlaAspProMetProLeuPheAlaPheGlyValGlySerGlnPhePheAsnGly

561 CTCATCGACCAGACCGAGATCTTCTTCCGCATGGCCCAGGCCCTAGGGTTCAACCCCCAC 580
LeuIleAspGlnThrGluIlePhePheArgMetAlaGlnAlaLeuGlyPheAsnProHis

581 CTCGAGAAGCCTTAA 585
LeuGluLysProEnd

9/11

FIGURE 7

M11 TL Phosphatase (29A1A=29A2A)
Complete Gene Sequence

ATGTATAAATGGATTATTGAGGGTAAGCTTGCCCAAGCACCTTTTCCAAGCCTAGGTGAA
1 MetTyrLysTrpIleIleGluGlyLysLeuAlaGlnAlaProPheProSerLeuGlyGlu 20

CTAGCCGATCTCAAAAGACTTTTCGACGCCATTATTGTTCTTACAATGCCGCATGAACAA
21 LeuAlaAspLeuLysArgLeuPheAspAlaIleIleValLeuThrMetProHisGluGln 40

CCGCTTAATGAGAAATATATCGAGATATTAGAGAGCCATGGATTCCAAGTCCTCCATGTC
41 ProLeuAsnGluLysTyrIleGluIleLeuGluSerHisGlyPheGlnValLeuHisVal 60

CCCACGCTCGACTTTCATCCTTTAGAACTCTTCGACCTTTTGAAAACAAGCATATTCATT
61 ProThrLeuAspPheHisProLeuGluLeuPheAspLeuLeuLysThrSerIlePheIle 80

GATGAAAACCTGGAGAGATCCACAGAGTGCTTGTCCACTGCATGGGAGGCATAGGCCGG
81 AspGluAsnLeuGluArgSerHisArgValLeuValHisCysMetGlyGlyIleGlyArg 100

AGCGGGCTTGTAAGTCTGCGTACTTAATATTCAAAGGTTATGATATTTACGACGCGGTA
101 SerGlyLeuValThrAlaAlaTyrLeuIlePheLysGlyTyrAspIleTyrAspAlaVal 120

AAGCATGTGAGAACGGTAGTGCCTGGTGCTATTGAAAACAGAGGGCAAGCGTTAATGCTT
121 LysHisValArgThrValValProGlyAlaIleGluAsnArgGlyGlnAlaLeuMetLeu 140

GAGAACTACTATACCCTGGTCAAAAGTTTCAACAGAGAGTTGCTGAGAGACTACGGGAAG
141 GluAsnTyrTyrThrLeuValLysSerPheAsnArgGluLeuLeuArgAspTyrGlyLys 160

AAAATTTTCACGCTCGGTGACCCGAAGGCGGTTCTCCACGCTTCTAAGACGACTCAGTTC
161 LysIlePheThrLeuGlyAspProLysAlaValLeuHisAlaSerLysThrThrGlnPhe 180

ACGATTGAACTCTTAAGCAACTTACACGTCAACGAGGCGTTTCAATCAGTGCGATGGCT
181 ThrIleGluLeuLeuSerAsnLeuHisValAsnGluAlaPheSerIleSerAlaMetAla 200

CAATCACTGCTCCACTTTCACGACGTAAAGTCCGCTCTAACTGAAAGAAGTATTCGAA
201 GlnSerLeuLeuHisPheHisAspValLysValArgSerLysLeuLysGluValPheGlu 220

AACATGGAATTCTCATCCGCCTCAGAGGAGGTTCTGTCATTTATTCACCTACTCGATTTT
221 AsnMetGluPheSerSerAlaSerGluGluValLeuSerPheIleHisLeuLeuAspPhe 240

TATCAGGATGGCAGGGTTGTTTAAACATTTACGATTATCTCCCCGATAGGGTGGATTTG
241 TyrGlnAspGlyArgValValLeuThrIleTyrAspTyrLeuProAspArgValAspLeu 260

ATTTTATTGTGTAAGTGGGTTGTGATAAAATAGTTGAAGTCTCGTCTTCAGCGAAGAAA
261 IleLeuLeuCysLysTrpGlyCysAspLysIleValGluValSerSerSerAlaLysLys 280

ACCGTTGAGAAGCTTGTAAGGAAGAAAGGTTTCCCTATCTGGGCTAATTACTTAGACTAT
281 ThrValGluLysLeuValGlyArgLysValSerLeuSerTrpAlaAsnTyrLeuAspTyr 300

GTTTAG
301 ValEnd 302

10/11

FIGURE 8

Thermococcus CL-2 Phosphatase (30A1A)
Complete Gene Sequence

ATGAGAATCCTCCTCACCAACGACGACGGCATCTATTCCAACGGTCTGCGCGCGGCGGTG
1 MetArgIleLeuLeuThrAsnAspAspGlyIleTyrSerAsnGlyLeuArgAlaAlaVal 20

AAGGGCCTGAGCGAGCTCGGCGAGGTCTACGTCTGCGCCCCGCTCTTCCAGAGGAGCGCG
21 LysGlyLeuSerGluLeuGlyGluValTyrValValAlaProLeuPheGlnArgSerAla 40

AGCGGTCTGGGCGATGACCTACACAGGCCGATAAGGGCAAAGAGGGTTGACGTTCCCGGC
41 SerGlyArgAlaMetThrLeuHisArgProIleArgAlaLysArgValAspValProGly 60

GCGAAGATAGCGTATGGCATAGACGGAACGCCGACCGACTGCGTGATTTTGGCATCGCC
61 AlaLysIleAlaTyrGlyIleAspGlyThrProThrAspCysValIlePheAlaIleAla 80

CGCTTCGGCGACTTTTGATCTGGCGGTCTAGCGGGATAAACCTAGGCGAGAACCTGAGCAG
81 ArgPheGlyAspPheAspLeuAlaValSerGlyIleAsnLeuGlyGluAsnLeuSerThr 100

GAGATAACCGTCTCCGGAACGGCCTCGGCGGCGATAGAGGCTTCCACCCACGGGATTCCA
101 GluIleThrValSerGlyThrAlaSerAlaAlaIleGluAlaSerThrHisGlyIlePro 120

AGTGTAGCTATAAGCCTCGAGGTCTGAGTGAAGAAGACCCTCGGCGAGGGGGAGGGTATT
121 SerValAlaIleSerLeuGluValGluTrpLysLysThrLeuGlyGluGlyGluGlyIle 140

GACTTCTCGGTTTCAGCACACTTCCTGAGAAGGATAGCGACGGCTGTCCTTAAGAAGGGC
141 AspPheSerValSerAlaHisPheLeuArgArgIleAlaThrAlaValLeuLysLysGly 160

CTGCCTGAAGGGGTGGACATGCTCAACGTGAACGTCCCTAGCGACGCCAGCGAGGGGACT
161 LeuProGluGlyValAspMetLeuAsnValAsnValProSerAspAlaSerGluGlyThr 180

GAGATCGCCATAACGCGCCTCGCGAGGAAGCGCTATTCTCCGACGATAGAGGAGAGGATA
181 GluIleAlaIleThrArgLeuAlaArgLysArgTyrSerProThrIleGluGluArgIle 200

GACCCCAAGGGCAACCCCTACTACTGGATCGTTGGCAGGCTCGTCCAGGAGTTTCGAGCCG
201 AspProLysGlyAsnProTyrTyrTrpIleValGlyArgLeuValGlnGluPheGluPro 220

GGCACGGACGCCTACGCTCTGAAAGTCGAGAGAAAGGTCAGCGTCACGCCCATAAACATC
221 GlyThrAspAlaTyrAlaLeuLysValGluArgLysValSerValThrProIleAsnIle 240

GACATGACTGCGAGGGTTGACTTTGAGAACCCTTCAAAGGCTTCTGAGCCTGTGA
241 AspMetThrAlaArgValAspPheGluAsnLeuGlnArgLeuLeuSerLeuEnd 258

11/11

FIGURE 9

Aquifex VF-5 Phosphatase (34A1A)
Complete Gene Sequence

ATGGAAACTTAAAAAGTACCTAGAAGTTGCAAAATAGCCGCGCTCGCGGGTGGGCAG
1 MetGluAsnLeuLysLysTyrLeuGluValAlaLysIleAlaAlaLeuAlaGlyGlyGln 20

GTTCTGAAAGAAAACCTTCGGAAAGGTAAAAAAGGAAAACATAGAGGAAAAAGGGGAAAAG
21 ValLeuLysGluAsnPheGlyLysValLysLysGluAsnIleGluGluLysGlyGluLys 40

GACTTTGTAAGTTACGTGGATAAAACTTCAGAGGAAAGGATAAAGGAGGTGATACTCAAG
41 AspPheValSerTyrValAspLysThrSerGluGluArgIleLysGluValIleLeuLys 60

TTCTTTCCCGATCACGAGGTTCGTAGGGGAAGAGATGGGTGCGGAGGGAAGCGGAAGCGAA
61 PhePheProAspHisGluValValGlyGluGluMetGlyAlaGluGlySerGlySerGlu 80

TACAGGTGGTTCATAGACCCCTTGACGGCACAAAGAACTACATAAACGGTTTCCCATC
81 TyrArgTrpPheIleAspPrpLeuAspGlyThrLysAsnTyrIleAsnGlyPheProIle 100

TTTGCCGTATCAGTGGGACTTGTTAAGGGAGAAGAGCCAATTGTGGGTGCGGTTTACCTT
101 PheAlaValSerValGlyLeuValLysGlyGluGluProIleValGlyAlaValTyrLeu 120

CCTTACTTTGACAAGCTTTACTGGGGTGCTAAAGGTCTCGGGGCTTACGTAAACGGAAAG
121 ProTyrPheAspLysLeuTyrTrpGlyAlaLysGlyLeuGlyAlaTyrValAsnGlyLys 140

AGGATAAAGGTAAAGGACAATGAGAGTTTAAAGCACGCCGGAGTGGTTTACGGATTTCCC
141 ArgIleLysValLysAspAsnGluSerLeuLysHisAlaGlyValValTyrGlyPhePro 160

TCTAGGAGCAGGAGGGACATATCTATCTACTTGAACATATTCAAGGATGTCTTTACGAA
161 SerArgSerArgArgAspIleSerIleTyrLeuAsnIlePheLysAspValPheTyrGlu 180

GTTGGCTCTATGAGGAGACCCGGGGCTGCTGCGGTTGACCTCTGCATGGTGGCGGAAGGG
181 ValGlySerMetArgArgProGlyAlaAlaAlaValAspLeuCysMetValAlaGluGly 200

ATATTTGACGGGATGATGGAGTTTGAAATGAAGCCGTGGGACATAACCGCAGGGCTTGTA
201 IlePheAspGlyMetMetGluPheGluMetLysProTrpAspIleThrAlaGlyLeuVal 220

ATACTGAAGGAAGCCGGGGCGTTTACACACTTGTGGGAGAACCCTTCGGAGTTTCGGAC
221 IleLeuLysGluAlaGlyGlyValTyrThrLeuValGlyGluProPheGlyValSerAsp 240

ATAATTGCGGGCAACAAAGCCCTCCACGACTTTATACTTCAGGTAGCCAAAAAGTATATG
241 IleIleAlaGlyAsnLysAlaLeuHisAspPheIleLeuGlnValAlaLysLysTyrMet 260

GAAGTGGCGGTGTGA
261 GluValAlaValEnd 265